

FORM PTO-1449  U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE  INFORMATION DISCLOSURE STATEMENT BY APPLICANT  (Use several sheets if necessary)	ATTY. DOCKET NO. COG-2-0980.02.US	SERIAL NO. 10/707,588
	APPLICANT Tesfai et al.	
	FILING DATE December 23, 2003	GROUP 2611

## U.S. PATENT DOCUMENTS

EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
/S.V./	4,121,221	10/1978	Meadows			
	4,599,734	07/1986	Yamamoto			
	4,639,914	01/1987	Winters			
	5,274,844	12/1993	Harrison et al.			
	5,394,435	02/1995	Weerackody			
	5,437,055	07/1995	Wheatley, III			
	5,457,808	10/1995	Osawa et al.			
	5,491,723	02/1996	Diepstraten			
	5,493,307	02/1996	Tsujimoto			
	5,507,035	04/1996	Bantz et al.			
	5,570,366	10/1996	Baker et al.			
	5,577,265	11/1996	Wheatley, III			
	5,610,617	03/1997	Gans et al.			
	5,752,173	05/1998	Tsujimoto			
	5,761,193	06/1998	Derango et al.			
	5,761,237	06/1998	Petersen et al.			
	5,812,531	09/1998	Cheung et al.			
	5,848,105	12/1998	Gardner et al.			
	5,854,611	12/1998	Gans et al.			
	5,898,679	04/1999	Brederveld et al.			
	5,912,921	06/1999	Warren et al.			
	5,539,832	07/1999	Weinstein et al.			
	5,924,020	07/1999	Forssen et al.			
	5,930,248	07/1999	Langlet et al.			
✓	5,982,327	11/1999	Vook et al.			

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/S.V./		6,008,760	12/1999	Shatill			
		6,037,898	03/2000	Parish et al.			
		6,038,272	03/2000	Golden			
		6,044,120	03/2000	Bar-David et al.			
		6,058,105	05/2000	Hochwald et al.			
		6,091,934	07/2000	Berman et al.			
		6,097,771	08/2000	Foschini			
		6,118,788	09/2000	Kermani			
		6,122,260	09/2000	Liu et al.			
		6,124,824	09/2000	Xu et al.			
		6,141,393	10/2000	Thomas et al.			
		6,141,567	10/2000	Youssefmir et al.			
		6,144,651	11/2000	Rinchuso et al.			
		6,144,711	11/2000	Raleigh et al.			
		6,147,985	11/2000	Bar-David et al.			
		6,157,340	12/2000	Xu et al.			
		6,157,843	12/2000	Derango et al.			
		6,177,906	01/2001	Petrus			
		6,185,440	02/2001	Barratt et al.			
		6,195,045	02/2001	Xu et al.			
		6,211,671	04/2001	Shatill			
		6,252,548	06/2001	Jeon			
		6,252,884	06/2001	Hunter			
		6,266,528	07/2001	Farzaneh			
		6,295,026	09/2001	Chen et al.			
V		6,298,092	10/2001	Heath, Jr.			

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/S.V./	6,307,882	10/2001	Marzetta			
	6,317,466	11/2001	Foschini et al.			
	6,327,310	12/2001	Hochwald et al.			
	6,331,837	12/2001	Shattil			
	6,023,625	02/2002	Myers Jr.			
	6,349,219	02/2002	Hochwald et al.			
	6,351,499	02/2002	Paulraj et al.			
	6,362,781	03/2002	Thomas et al.			
	6,369,758	04/2002	Zhang			
	6,370,182	04/2002	Bierly et al.			
	6,377,631	04/2002	Raleigh			
	6,377,636	04/2002	Paulraj et al.			
	6,377,819	04/2002	Gesbert et al.			
	6,400,699	06/2002	Airy et al.			
	6,400,780	06/2002	Rashid-Farrokhi et al.			
	6,442,214	08/2002	Boleskei et al.			
	6,462,709	10/2002	Choi			
	6,463,295	10/2002	Yun			
	6,473,467	10/2002	Wallace et al.			
	6,522,898	02/2003	Kohno et al.			
	6,549,786	04/2003	Cheung			
	6,570,929	05/2003	Eriksson			
	6,584,161	06/2003	Hottinen			
	6,636,568	10/2003	Kadous			
	6,646,600	11/2003	Vail et al.			
V	6,684,064	01/2004	Kazakevich et al.			

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/S.V/		6,687,492	02/2004	Sugar et al.			
		6,728,517	04/2004	Sugar et al.			
		6,862,271	03/2005	Medvedev et al.			
		6,873,606	03/2005	Agrawal et al.			
		6,873,651	03/2005	Tesfai et al.			
		6,940,917	09/2005	Menon et al.			
		6,956,907	10/2005	Ketchum, John W.			
		2001/0012764	08/2001	Edwards et al.			
		2001/0015994	08/2001	Nam			
		2001/0046255	11/2001	Shattil			
		2001/0053143	12/2001	Li et al.			
		2002/0001316	01/2002	Hornsby et al.			
		2002/0024975	02/2002	Hendler			
		2002/0034191	03/2002	Shattil			
		2002/0039884	04/2002	Raynes et al.			
		2002/0064246	05/2002	Kelkar et al.			
		2002/0067309	06/2002	Baker et al.			
		2002/0072392	06/2002	Awatier et al.			
		2002/0085643	07/2002	Kitchener et al.			
		2002/0102950	08/2002	Gore et al.			
		2002/0111142	08/2002	Klimovitch			
		2002/0118781	08/2002	Thomas et al.			
		2002/0122383	09/2002	Wu et al.			
		2002/0122501	09/2002	Awatier et al.			
		2002/0127978	09/2002	Khatri			
V		2002/0136170	09/2002	Struhsaker			

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/S.V./		2002/0141355	10/2002	Struhsaker et al.			
		2002/0147032	10/2002	Yoon et al.			
		2002/0158801	10/2002	Crilly, Jr. et al.			
		2002/0159537	10/2002	Crilly, Jr.			
		2002/0172186	11/2002	Larsson			
		2002/0172269	11/2002	Xu			
		2002/0196842	12/2002	Onggosanusi et al.			
		2003/0002450	01/2003	Jalali et al.			
		2003/0022693	01/2003	Gerogiokas et al.			
		2003/0032423	02/2003	Boros et al.			
		2003/0048761	03/2003	Jarett			
		2003/0108117	06/2003	Ketchum et al.			
		2003/0114108	06/2003	Frecassetti et al.			
		2003/0125090	07/2003	Zeira			
		2003/0139194	07/2003	Onggosanusi et al.			
		2003/0157954	08/2003	Medvedev et al.			
		2003/0181165	09/2003	Sugar et al.			
		2004/0072546	04/2004	Sugar et al.			
		2004/0104839	06/2004	Valazquez et al.			

## FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
							YES	NO
/S.V./		01/45300	06/2001	WO				
/S.V./		02/03568	01/2002	WO				

## OTHER DOCUMENTS

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EXAMINER INITIAL		DESCRIPTION (Including Author, Title, Date, Pertinent Pages, Etc.)
/S.V./		"BLAST High-Level Overview", Lucent Technologies, July 18, 2000.
		"Lucent's 'BLAST' Chips to Take Off in Wireless Market", EETimes.com, October 16, 2002.
	*	Ariyavisitakul et al., "Optimum Space-Time Processors With Dispersive Interference – Unified Analysis And Required Filter Span", 1999 IEEE International Conference On Communications, Vol. 2, pp. 1244-1249, (1999).
		Aziz et al., "Indoor Throughput and Range Improvements Using Standard Complaint AP Antenna Diversity in IEEE 802.11a and ETSI HIPERLAN/2", Vehicular Technology Conference, 2002, VTC 2001, October 7-11, 2001, IEEE VTS 54 <sup>th</sup> , Vol. 4, pp. 2294-2298.
		Bablan et al., "Optimum Diversity Combining and Equalization in Digital Data Transmission with Applications to Cellular Mobile Radio-Part II: Numerical Results", May 1992; IEEE Transactions on Communications, vol. 30, No. 5; pp. 895-907.
		Briesemeister et al., "Role-Based Multicast in Highly Mobile but Sparsely Connect Ad-Hoc Networks"; First Annual Workshop on Mobile Ad Hoc Networking & Computing; pp. 45-50; August 2000.
		Brunner et al., "Downlink Beamforming for WCDMA Based on Uplink Channel Parameters"; Proceedings of 3 <sup>rd</sup> European Personal Mobile Conference (EPMCC '99), March 1999, pp. 375-380.
		Chiu et al., "OFDM Receiver Design", EE225C, Fall 2000, University of California, Berkeley.
		Chizhik et al., "Keyholes, Correlations, and Capacities of Multielement Transmit and Receiver Antennas", IEEE Transactions on Wireless Communications, Vol. 1, No. 2, April 2002, pp. 361-368.
		Choi et al., "MISO CDMA Transmission with Simplified Receiver for Wireless Communication Handsets", IEEE Transactions on Communications, Vol. 49, No. 5, May 2002.
		Chuah et al., "Capacity of Multi-Antenna Array Systems in Indoor Wireless Environment", November 1998, IEEE Globecom.
↓		Golden et al., "Detection Algorithm and Initial Laboratory Results Using V-BLAST Space-Time Communication Architecture", Electronic Letters, January 7, 1999, Vol. 35, No. 1.

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/S.V./		Golden et al., "V-BLAST: A High Capacity Space-Time Architecture for the Rich-Scattering Wireless Channel", Bell Laboratories, Lucent Technologies, Proc. Int'l Symposium on Advanced Radio Technologies, Boulder, CO, September 10, 1998.
		Golub et al., <u>Matrix Computation</u> , "7.3 Power Iterations", The Johns Hopkins University Press, Second Edition, pp. 351, (1983).
		Heath et al., "A Simple Scheme for Transmit Diversity Using Partial Channel Feedback", Signals, Systems & Computers, Conference Record of the Thirty-Second Asilomar Conference, November 1-4, 1998; vol. 2; pp. 1073-1078.
		Imer et al., "MISO Concepts for Frequency-Selective Channels", 2002 International Zurich Seminar on Broadband Communications Access, February 19-21, 2002.
		Iserte et al., "Iterative Algorithm for the Estimation of Distributed Sources Localization Parameters", SSP 2001, 11th IEEE Workshop on Statistical Signal Processing, August 2001.
		Iserte et al., "Joint Beamforming Strategies in OFDM-MIMO Systems", ICASSP 2002, IEEE International Conference on Acoustics, Speech and Signal Processing, May 2002.
		Iserte et al., "Pre-and Post-Beamforming in MIMO Channels Applied to HIPERLAN/2 and OFDM", IST Summit 2001, IST Mobile Communications Summit, September 2001.
		Ivrlac et al., "On Channel Capacity of Correlated MIMO Channels", ITG Fokusprojekt: Mobilkommunikation "Systeme mit Intelligenten Antennen", Ilmenau, 2001.
		Jakes, "Microwave Mobile Communications", Copyright 1974, pp. 313-320 and pp. 489-498.
		Jungnickel et al., "A MIMO WLAN Based on Linear Channel Inversion", IEE Seminar-MIMO Communication Systems from Concept TO Implementation, December 2001, pp. 20/1-20/6.
		Jungnickel et al., "Performance of a MIMO System with Overlay Pilots", IEEE GlobeCom 2001, pp. 594-598.
↓		Junqiang et al., "Spatial Multiuser Access with MIMO Smart Antennas for OFDM Systems", IEEE VTC 2001, September 2001, pp. 1553-1557.

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/S.V./	.	LAN MAN Standards Committee Of The IEEE Computer Society, "Information Technology - Telecommunications And Information Exchange Between Systems - Local And Metropolitan Area Networks - Specific Requirements - Part 11: Wireless LAN Medium Access Control (MAC) And Physical Layer (PHY) Specifications", ANSI/IEEE Std 802.11, 1999 Edition (R2003), (Reaffirmed 12 June 2003).
		Lee et al., "Antenna Diversity for an OFDM System in a Fading Channel", Proceeding of IEEE MILCOM 1999, November 1999, pp. 1104-1109.
	.	Li et al., "Adaptive Antenna Arrays For OFDM Systems With Cochannel Interference", IEEE Transactions On Communications, Vol. 47, No. 2, pp. 217-229, (February 1999).
		Love et al., "Equal Gain Transmission in Multiple-Input Multiple-Output Wireless Systems", November 2002, Proceedings of IEEE Globecom, pp. 1124-1128.
		Lucent Technologies, "Lucent Technologies: Chips Poised to Bring 'BLAST' Multiple Input/Multiple Output Technology to Laptops, PDAs and Other Mobile Devices", October 16, 2002, lucent.com.
		Meyer-Ottens, et al. "Downlink Beamforming for W-CDMA Using Feedback and Interference Estimate", March 9, 2001.
		Morgan, "Interaction of Adaptive Antenna Arrays in an Arbitrary Environment", The Bell System Technical Journal, January 1965, pp. 23-47.
	.	Narula et al., "Efficient Use Of Side Information In Multiple-Antenna Data Transmission Over Fading Channels", IEEE Journal On Selected Areas In Communications, Vol. 16, No. 8, pp. 1423-1436, (October 1998).
	.	Onggosanusi et al., "Performance Analysis Of Closed-Loop Transmit Diversity In The Presence Of Feedback Delay", IEEE Transactions On Communications, Vol. 49, No. 9, pp. 1618-1630, (September 2001).
		Raleigh et al., "Spatio-Temporal Coding for Wireless Communication", IEEE Transactions on Communications, Vol. 46, No. 3, March 1998, pp. 357-366.
		Sanchez et al., "CSMA/CA Beam Forming Antennas in Multi-hop Packet Radio"; Proc. For Swedish Workshop on Wireless Ad-Hoc Networks, March 5-6, 2001.
↓		Stridh et al., "MIMO Channel Capacity on a Measured Indoor Radio Channel at 5.8 GHz", Proc. of the Asilomar Conf. on Signals, Systems & Computers, Vol. 1, October 2000, pp. 733-737.

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/S.V./		Stridh et al., "Spatial Characterization of Indoor Radio Channel Measurements at 5 GHz", SAM 2000, March 2000, pp. 58-62.
		Vaidyanathan et al., "The Role In Lossless Systems in Modern Digital Signal Processing: A Tutorial", IEEE Transactions on Education, Vol. 32, August 1989, pp. 181-197.
		Wallace et al., "Experimental Characterization of the MIMO Wireless Channel: Data Acquisition and Analysis", February 27, 2002, Department of Electrical and Computer Engineering, Brigham Young University.
	•	Wennström et al., "On The Optimality And Performance Of Transmit And Receive Space Diversity In MIMO Channels", IEEE Seminar on Communications Systems from Concept to Implementations, (December 12, 2001).
		Wolniansky et al., "V-BLAST: An Architecture for Realizing Very High Data Rates Over the Rich-Scattering Wireless Channel", Proc. ISSSE-98, Pisa, Italy, September 29, 1998.
	•	Yang et al., "Joint Transmitter – Receiver Optimization For Multi-Input Multi-Output Systems With Decision Feedback", IEEE Transactions On Information Theory, Vol. 40, No. 5, pp. 1334-1347, (September 1994).
		Yang et al., "On Joint Transmitter and Receive Optimization for Multiple-Input-Multiple-Output (MIMO) Transmission Systems", IEEE Transactions on Communications, Vol. 42, No. 12, December 1994.
V		Yeh, "An Analysis of Adaptive Retransmission Arrays in a Fading Environment", The Bell System Technical Journal, October 1970, pp. 1811-1825.

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